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ABSTRACT

This booklet contains a compilation of student terminal goals, program goals, and behavioral objectives for science education developed for the public schools of Mesa, Arizona. The program goals and behavioral objectives span the science curriculum from grade one through senior high school level for each of the four terminal goals which are (1) know fundamental facts and principles of science, (2) possess the abilities and skills needed to engage in the processes of science, (3) understand the investigative nature of science, and (4) have appreciation of scientists, science, and the consequences of science. (PEB)

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GOALS AND BEHAVIORAL OBJECTIVES

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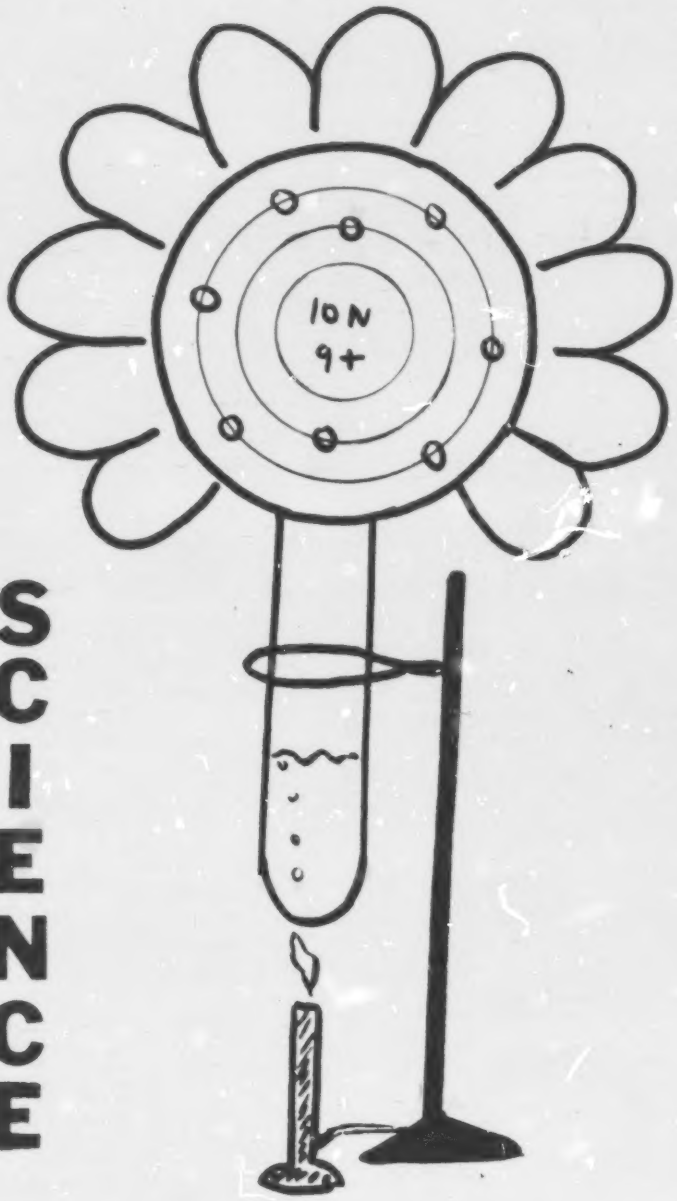

SCIENCE

MESA PUBLIC SCHOOLS

Mesa, Arizona

SE 017 476

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MESA PUBLIC SCHOOLS

Mesa, Arizona

SCIENCE EDUCATION

Student Terminal Goals, Program Goals, and Behavioral Objectives

Dr. George N. Smith, Superintendent

Dr. Gavin C. Humphrey, Associate Superintendent

Dr. Dell Chamberlain, Assistant Superintendent

TERMINAL GOALS

I. Know fundamental facts and principles of science.

II. Possess the abilities and skills needed to engage in the processes of science.

III. Understand the investigative nature of science.

IV. Have appreciation of scientists, science, and the consequences of science.

It must be understood that there is a continuum in the program goals, e.g. I is carried through Primary, Intermediate, Junior High, and Senior High as the same concept.

TERMINAL GOAL I. KNOW FUNDAMENTAL FACTS AND PRINCIPLES OF SCIENCE

Program Goals -- Primary Level: (1 - 2 - 3)

Biological Science Goals:

1. The student should know that the green plants manufacture food that animals use.

   Behavioral Objective: Demonstrates how the absence of light affects leaves.

2. The student should know the differences between living and non-living things--that living things consist of plants and animals.

   Behavioral Objective: Differentiates among living and non-living things.

3. The student should know that living things reproduce and that like living things reproduce in similar ways.

   Behavioral Objective: Proves seeds produce plants by planting and growing them.

4. The student should know that living things are affected by their environment and that they, in turn, affect their environment.

   Behavioral Objective: Compares the growth of a desert plant with a mountain plant.

5. The student should know that organs and systems of the human body are functional and alive.

   Behavioral Objective: Identifies the five senses.

Physical Science Goals:

6. Not applicable (see #6, Junior High).

7. The student should have a general understanding of simple machines.

   Behavioral Objective: Names five machines.

8. The student should know about magnetism.

   Behavioral Objective: Separates magnetic things from non-magnetic things.

9. The student should know that matter commonly exists as solids, liquids, and gases.

   Behavioral Objective: Identifies the three main forms of matter.

10. The student should know that there are many forms of energy and that the sun is the earth's chief source of radiant energy.

    Behavioral Objective: Demonstrates the sun's effect on soil temperature.

11. The student should know the difference between a physical and a chemical change.

    Behavioral Objective: Gives one example of a physical change and one of chemical change.

12. The student should know that rockets and jet airplanes move forward in a reaction to escaping exhaust gases.

    Behavioral Objective: Demonstrates with a balloon how a jet works.

Earth Science Goals:

13. The student should understand the changing nature of the earth, its plants, and its animals.

    Behavioral Objective: Tells how the climate was during the ages of the dinosaurs.

14. The student should know that there are various types of rocks, depending on their origin.

    Behavioral Objective: Identifies from a collection those rocks which are in layers.

15. The student should have a general understanding of what soil is and how it is made. Further, he should be aware of weathering and erosion.

    Behavioral Objective: Identifies sand, clay, humus, etc., of a given soil sample.

16. The student should know that land forms have been brought about by natural forces.

    Behavioral Objective: Describes how a volcano builds up the land's surfaces.

17. The student should know that there are many stars in the universe and that the sun is our closest star.

    Behavioral Objective: Tells why the sun looks bigger than other stars.

18. The student should know that our solar system is composed of a sun (star), planets, and moons.

    Behavioral Objective: Lists three types of bodies in our solar system.

19. The student should know that the movements of the earth cause daily, seasonal, and annual changes.

    Behavioral Objective: Illustrates how the earth moves around its sun.

20. The student should know that ocean water is salty; that the ocean shore, water above the continental shelf, and the deep ocean are habitats for plant and animal life.

    Behavioral Objective: Identifies from a model or chart a continent, continental shelf, and the ocean floor.

21. The student should know the three main kinds of clouds. Further, he should know about evaporation and condensation in relationship to the water cycle.

    Behavioral Objective: Identifies the three main types of clouds.

Program Goals -- Intermediate Level: (4 - 5 - 6)

Biological Science Goals:

1. The student should have an understanding of the proper diet and its function in the maintenance of life.

   Behavioral Objective: Revises a given breakfast menu so that it is well balanced.

2. The student should be able to distinguish between organisms through variation in structure and function.

   Behavioral Objective: Using a microscope and five unidentified slides of cells, demonstrates which are plant and which are animal.

3. The student should know a living thing reproduces itself and develops in a given environment. Further, the cell is the unit of structure and function; a living thing develops from a single cell. The student should also know the characteristics of a living thing are determined by a genetic code.

   Behavioral Objective: Identifies the parts of a plant or animal cell.

4. The student should know what is meant by "the balance of nature."

   Behavioral Objective: Draws a diagram to illustrate an example of "the balance of nature."

5. The student should have a general overview about the structure and function of the human body, that is,

. . . .the circulatory system
. . . .the skeletal system
. . . .the muscular system
. . . .the respiratory system
. . . .the digestive system
. . . .the nervous system
. . . .the excretory system
. . . .the endocrine glands
. . . .the sense organs

Behavioral Objective: Describes what would happen to a person's eyes if you were to flash a flashlight into them.

Physical Science Goals:

6. Not applicable.

7. The student should understand the principles of simple machines.

   Behavioral Objective: Using a board and a fulcrum, demonstrates three ways to make a simple machine.

8. The student should know that an electric current results in a magnetic field, that electricity produces magnetism, and that magnetism produces electricity through electro-magnetic induction.

   Behavioral Objective: Demonstrates a magnetic field.

9. The student should have a knowledge of the mechanics of the atomic and molecular nature of matter.

   Behavioral Objective: Identifies the particles of an atom.

10. The student should know that a loss or gain of energy affects molecular motion.

    Behavioral Objective: Demonstrates how heat travels.

11. The student should know that in a chemical change the atoms in matter do not change, but the way they are arranged in molecules does change.

    Behavioral Objective: Cites examples of chemical changes.

12. The student should know the principle of the rocket, the problems of space travel, and the accomplishments to date.

    Behavioral Objective: Constructs a working model to illustrate the principle of the rocket.

Earth Science Goals:

13. The student should have some knowledge of the fossil record and its part in the formation of the ideas of evolution.

    Behavioral Objective: Gives three reasons why the dinosaurs are extinct.

14. The student should know the three basic types of rocks: sedimentary, igneous, and metamorphic.

    Behavioral Objective: Identifies from a collection two sedimentary, two igneous, and two metamorphic rocks.

15. The student should know that weathering is a breaking up of rock and may be due to mechanical forces or chemical processes. Further, the student should know that erosion is a transportation of materials from one place to another and be aware of the damage caused by erosion.

    Behavioral Objective: Recognizes three examples of erosion.

16. The student should know that the wearing down of the crust is balanced by the building up of new land by layers of sediment, changes caused by volcanism, and the movement of part of the solid crust of the earth.

    Behavioral Objective: Designs a model to illustrate folding and faulting.

17. The student should know that there are different kinds of stars.

    Behavioral Objective: Defines the characteristics of a star.

18. The student should know the relationships of the member planets of our solar system.

Behavioral Objective: Given a list of planets, puts the names in order, from the sun to the outermost planets.

19. The student should know that the path of the moon and of any other celestial body within the solar system is predictable.

Behavioral Objective: Explains the law of gravitation.

20. The student should know the vastness of the ocean and that different kinds of life exist at different levels.

Behavioral Objective: Identifies one animal from each level.

21. The student should be aware of the types of clouds and other weather signals. He should know about new forecasting methods.

Behavioral Objective: Describes how a meteorologist can use a photograph recorded from a weather satellite to predict weather.

Program Goals -- Junior High School Level

Biological Science Goals:

1. The student should know the metabolism function of the body and the importance of various chemical elements used in the life processes.

Behavioral Objective: Lists the five minerals most essential for body growth.

2. The student should know that organisms can be grouped according to their cellular function.

Behavioral Objective: Arranges ten organisms according to their cellular organization.

3. The student should understand the differences between asexual and sexual reproduction.

   Behavioral Objective: Explains the basic differences between asexual and sexual reproduction.

4. The student should understand the importance of nature's cycles.

   Behavioral Objective: Lists the four basic cycles found in nature.

5. The student should know the nine major systems of a mammal and understand the function of each.

   Behavioral Objective: Lists the nine major systems of a mammalian body.

Physical Science Goals:

6. The student should know that physical and chemical changes do not alter the mass of matter and that the principle must be modified to include energy as well as mass if nuclear changes are correct.

   Behavioral Objective: Demonstrates that a physical change does not alter the total mass of matter.

7. The student should be able to work the simplest types of mathematical problems involving force, velocity, acceleration, energy, and buoyancy.

   Behavioral Objective: Solves problems on the acceleration rate of a freely falling body from a given set of data.

8. Not applicable.

9. The student should know that during chemical change, atoms react to produce change in the molecules; and in chemical or physical changes, the total amount of matter remains unchanged. Further, the student should know that in nuclear reactions, a loss of matter is a gain in energy: the sum of the matter and energy remains constant.

   Behavioral Objective: States the parts of an atom that react to produce a chemical change.

10. The student should have knowledge and understanding of heat as a measure of the total kinetic energy of motion of all molecules and atoms in an object.

Behavioral Objective: Cites an example to show that the presence of heat is a measure of kinetic energy.

11. The student should have knowledge and understanding that chemical reactions take place between atoms in compounds.

Behavioral Objective: Lists the four types of chemical reactions.

12. The student should know the principles and problems of rocketry, the ecological problems of space travel, and the accomplishments to date.

Behavioral Objective: Relates the major accomplishments of space travel.

Earth Science Goals:

13. The student should have a knowledge of the fossil record as it relates to the evolutionary process.

Behavioral Objective: Arranges a group of related fossils in the proper sequence of development.

14. The student should be able to explain the origin and formation of the basic rocks and minerals and be able to identify them, using simple physical and chemical tests.

Behavioral Objective: Determines hardness of a mineral sample.

15. The student should be able to explain the processes of physical and chemical weathering and the effects of wind, water, and ice in eroding the land, and be conversant with the methods of soil and water conservation.

Behavioral Objective: Explains four common methods of soil conservation.

16. The student should be able to explain the movements of the earth's crust, its internal structure, the formation of mountains, plains, and plateaus, and the effects of volcanism on the earth's surfaces.

Behavioral Objective: Identifies the principle mountain ranges of the world.

17. The student should be able to explain the principles of the astronomical instruments, know the prominent stars and constellations, and the relationships of the stars and galaxies to each other.

Behavioral Objective: Draws a cross-section of a reflector telescope.

18. The student should know the names, structure, and arrangements of, and the relationships between members of the solar system.

Behavioral Objective: Lists the planets in order of distance from the sun.

19. The student should know something of the structure of the earth, how to determine location on the surface, and the determination of time and seasons.

Behavioral Objective: Determines latitude and longitude of a selected list of points on the globe.

20. The student should be able to explain the importance of the oceans, the instruments and methods of exploring the ocean depths, and the nature of waves and currents.

Behavioral Objective: Names four instruments for exploring the ocean.

21. The student should know the various types of clouds and other agents that cause water changes. Further, the student should know about weather forecasting.

Behavioral Objective: Predicts the weather from a set of weather data.

Program Goals -- Senior High School Level

Biological Science Goals:

1. The student should know the general health programs associated with the metabolic processes and relationship of the metabolic process to energy expenditure.

Behavioral Objective: Matches terms from lists of health problems and metabolic processes.

2. The student should understand the binomial nomenclature system and be able to use a simple identification key.

   Behavioral Objective: Identifies five insects as to kingdom, phylum, class, and order, using Jaques' "How to Know the Insects."

3. The student should have knowledge and understanding that reproduction enables an organism to renew and improve its species life in relation to its environment, whereas inbreeding may cause a regression.

   Behavioral Objective: Lists advantages and disadvantages of inbreeding as contrasted with mass breeding.

4. The student should have knowledge and understanding about inter-relationships of living things to their surroundings and to each other.

   Behavioral Objective: Matches lists of organisms and environments.

5. The student should have an in-depth understanding of:

   . . . .the skeletal system
   . . . .the muscular system
   . . . .the circulatory system
   . . . .the respiratory system
   . . . .the digestive system
   . . . .the nervous system
   . . . .the excretory system
   . . . .the endocrine glands
   . . . .the sense organs
   . . . .the reproductive system

   Behavioral Objective: Labels twenty bones on a drawing of a human body.

Physical Science Goals:

6. The student should have knowledge and understanding of matter and energy conservation laws as they relate to kinetic energy, momentum, or electrical charge, and should appreciate the generality and value of conservation principles.

   Behavioral Objective: Writes a chemical equation showing the conservation of electrical charges of atoms involved in bonding.

7. The student should have a utilitarian understanding of such concepts as gravity, force, velocity, acceleration, weight, equilibrium, inertia, and friction.

   Behavioral Objective: Given the pertinent facts, computes the acceleration rate of a rocket.

8. Not applicable.

9. The student should know the essential factors for combining atoms to form simple compounds.

   Behavioral Objective: Writes chemical equations showing the combining of simple atoms into compounds.

10. The student should understand the principles of energy as applied to living systems in everyday life.

    Behavioral Objective: Explains the relationship between sunlight and green plants.

11. The student should be able to predict expected results of combining simple atoms in compounds.

    Behavioral Objective: Predicts possible combination of atoms with the use of the electromotive series.

12. The student should know the ecological factors of space travel.

    Behavioral Objective: Names five factors needed to maintain life in space.

Earth Science Goals:

13. The student should know that man has been able to manipulate and cause some of the evolutionary changes that have occurred.

    Behavioral Objective: Lists five examples of man's manipulation of evolutionary changes in farm animals.

14. Not applicable.

15. Not applicable.

16. Not applicable.

17. Not applicable.

18. Not applicable.

19. Not applicable.

20. The student should know the homeostatic basis of existence of plants and animals in the ocean; the oceanographic/ecological relationships, and the relationship to land plants and animals.

    Behavioral Objective: Arranges a list of four marine animals into a food chain.

21. The student should be able to explain the general composition of the earth's atmosphere.

    Behavioral Objective: Lists the five most common elements in the atmosphere.

TERMINAL GOAL II. POSSESS THE ABILITIES AND SKILLS NEEDED TO ENGAGE IN THE PROCESSES OF SCIENCE

Program Goals -- Primary Level: (1 - 2 - 3)

1. The student should be able to recognize a problem in a simple and a familiar situation.

   Behavioral Objective: States the problem after a scientific demonstration.

2. The student should understand the idea that effects have causes and explanations.

   Behavioral Objective: Given a simple scientific demonstration, distinguishes between the cause and the effect.

3. The student should have an understanding of the steps necessary for solving a simple scientific problem.

   Behavioral Objective: Given a simple scientific problem, states possible steps for solving it.

4. The student should be able to collect data based on a simple, direct observation, with proper direction and guidance.

   Behavioral Objective: Records observations of a demonstration/experiment.

5. The student should be able to abstract data into simple form and draw conclusions.

   Behavioral Objective: Given a set of simple data, will construct a bar graph.

6. Not applicable.

7. Not applicable.

8. Not applicable.

Program Goals -- Intermediate Level: (4 - 5 - 6)

1. The student should be able to recognize a problem in a new situation.

   Behavioral Objective: States the problem after a scientific demonstration.

2. The student should understand the nature of a scientific hypothesis and be able to recognize or formulate a simple hypothesis.

   Behavioral Objective: Matches effects with causes.

3. The student should be able to plan appropriate observations and/or experiments for validating simple hypotheses.

   Behavioral Objective: Given a problem situation, devises a format for investigation.

4. The student should be able to make observations or measurements under proper guidance and also independently in familiar areas.

   Behavioral Objective: Makes observations and records data pertinent to a given experiment/demonstration.

5. The student should be able to plot data on graphs, arrange data on tables and charts, and be able to draw conclusions from the data.

   Behavioral Objective: Given a set of data, constructs a graph and interprets the results.

6. The student should know the distinction between a fact and a hypothesis.

   Behavioral Objective: Differentiates between hypotheses and facts.

7. The student should be able to identify the important ideas in his readings in science.

   Behavioral Objective: Abstracts essential ideas from several sources.

8. The student should begin to realize that the presentation of an idea by mass media does not establish its truth.

   Behavioral Objective: Distinguishes between levels of authority.

Program Goals -- Junior High School Level

1. The student should be able to recognize a problem in situations that are not familiar, and to define the problem reasonably well in terms appropriate for investigation.

   Behavioral Objective: Given an alteration of an ecological situation, predicts the problems that arise.

2. The student should understand the nature of a scientific hypothesis and be able to recognize and formulate a simple hypothesis that would be useful and testable.

   Behavioral Objective: Matches effects with causes.

3. The student should be able to devise plans for the collection of data relevant to the validation of a variety of hypotheses.

   Behavioral Objective: Given a problem situation, devises a format for investigation.

4. The student should be able to proceed independently to make some reasonably careful observations and/or reasonably precise measurements in several areas following a data/collection procedure of his own design.

   Behavioral Objective: Makes observations and records data pertinent to a given problem situation.

5. The student should be able to recognize the nature of changes described in verbal, graphical, and diagramatical data, and be able to interpret different pieces of data.

   Behavioral Objective: Collects data, constructs a graph, and interprets the results.

6. The student should be able to eliminate irrelevant material from consideration. Further, he should be able to abstract from available data, the information directly pertinent to the problem under investigation.

   Behavioral Objective: Discriminates between relevant and irrelevant material.

7. The student should be able to recognize the obvious scientific limitations in the material he reads in newspapers, magazines, and books. Further, he should appreciate the need for consulting several reference sources.

   Behavioral Objective: Judges the limitation of material by using several external sources of reference.

8. The student should realize that the commitment of ideas in mass media does not establish the truth.

   Behavioral Objective: Evaluates ideas committed to writing, as to their truth, on the basis of adequacy of data.

Program Goals -- Senior High School Level

1. The student should be able to demonstrate recognition of problem situations that are related to his own recent experiences.

   Behavioral Objective: Given a situation involving a population change, predicts the problems that arise.

2. The student should be able to formulate hypotheses appropriate for explaining or gaining greater understanding of phenomena they encounter in their daily life.

   Behavioral Objective: Predicts the possible effects of a given list of causes.

3. The student should be able to devise plans for the collection of data relevant to the validation of a variety of hypotheses.

   Behavioral Objective: Given a problem situation, devises a format for investigation.

4. The student should be able to observe phenomena directly and to make precise measurements with available apparatus.

   Behavioral Objective: Uses instruments to measure conditions in a demonstration/experiment.

5. The student should recognize that the accuracy of the results of a study depend on the dimensions of the quantitative data, the size of any samples used, and the adequacy of the design of the study.

   Behavioral Objective: Appraises two sets of data for accuracy on the basis of size of sample and study design.

6. The student should be able to distinguish among fact, hypothesis, and opinion, and understand the role that each plays in his vocational, political, social, and recreational relationships.

   Behavioral Objective: Discriminates between relevant and irrelevant material found in the public press.

7. The student should have the ability to read popular descriptions of science and be able to read conflicting reports and draw tentative conclusions based on analysis of these reports.

   Behavioral Objective: After reading conflicting reports, justifies his conclusions.

8. The student should realize that the commitment of ideas in mass media does not establish their truth.

   Behavioral Objective: Distinguishes between levels of authority in all sources of communication media.

9. The student should appreciate that scientific models are man-made and not imbedded in the nature of the real world.

   Behavioral Objective: Discriminates between a symbolic representation and the original object.

TERMINAL GOAL III. UNDERSTAND THE INVESTIGATIVE NATURE OF SCIENCE

Program Goals -- Primary Level: (1 - 2 - 3)

1. The student should begin to realize that science is essentially a search for understanding of our environment.

   Behavioral Objective: Relates the scientific concepts to his everyday environment.

2. The student should begin to realize that order can be observed in the universe.

   Behavioral Objective: Explains the cyclic phenomenon of day and night.

3. The student should have grasped the notion that one can make guesses about why things happen.

   Behavioral Objective: Explains what the result might be in a given situation.

4. The student should be able to measure.

   Behavioral Objective: Demonstrates a method for measuring a given object.

5. The student should realize that the field of science is subject to change.

   Behavioral Objective: Compares present-day to earlier models of a scientific invention.

Program Goals -- Intermediate Level: (4 - 5 - 6)

1. The student begins to understand the fundamental importance of making relevant, controlled, and accurate observations of phenomena under investigation.

   Behavioral Objective: Evaluates the accuracy of given data.

2. The student should know that laws are based on similar results having been observed repeatedly by many scientists working independently.

   Behavioral Objective: Predicts outcomes of an experiment based on previously established laws.

3. The student should have some idea about what scientific laws and theories are.

   Behavioral Objective: Defines a theory.

4. The student should understand that measurement can provide us with much clearer and more precise representations of phenomena than verbal descriptions.

   Behavioral Objective: Describes a method for measurement of a phenomenon.

5. The student should know that scientific ideas are subject to change.

   Behavioral Objective: Describes steps of development from original to present-day model of a scientific invention.

Program Goals -- Junior High School Level

1. The student should understand that science depends on relevant and accurate observations and experiments that must be directed intelligently and completed within a logical theoretical framework.

   Behavioral Objective: Evaluates the accuracy of given data.

2. The student should realize that the generalization of observations into laws makes possible the predictions of the results of many experiments.

   Behavioral Objective: Integrates results of different scientists into a generalization.

3. The student should have some understanding of the distinction between scientific laws and theories.

   Behavioral Objective: From a given list, distinguishes between a theory and a law.

4. The student should understand and appreciate the importance of measurement in scientific inquiry and perceive that all measurement is approximate.

   Behavioral Objective: Demonstrates skill and accuracy in massing (weighing) of a material.

5. The student should know that man is always modifying theories and laws based on new information.

   Behavioral Objective: Names five scientific concepts which have been revised.

Program Goals -- Senior High School Level

1. The student should realize that no phenomenon is ever considered so completely understood as to be beyond the province of further observation and experimentation.

   Behavioral Objective: From the results of a given study, generates additional possibilities for investigation.

2. The student should appreciate the distinction between observations and scientific laws.

   Behavioral Objective: From a listing, distinguishes between observation and laws.

3. Student should be able to differentiate between scientific laws and theories and be able to identify examples of each.

   Behavioral Objective: From a given list, distinguishes between a theory and law.

4. The student should understand and appreciate the power of description, prediction, and hypothesis testing that quanitative measurements provide.

   Behavioral Objective: From a variety of measurements, selects the appropriate instrument for a given situation.

5. The student should realize that as new information and technical skills are developed our present day scientific knowledge is refined to a greater degree.

   Behavioral Objective: Traces the evolution of a scientific theory.

TERMINAL GOAL IV. HAVE APPRECIATION OF SCIENTISTS, SCIENCE, AND THE CONSEQUENCES OF SCIENCE

Program Goals -- Primary Level: (1 - 2 - 3)

1. The student should be aware that science is everywhere.

   Behavioral Objective: Relates an object from his environment to science.

2. The student should be aware that scientists help us to understand the natural world.

   Behavioral Objective: Draws and labels one thing from the natural world that science has helped him to understand.

3. The student should appreciate the fact that science is both doing and explaining.

   Behavioral Objective: Makes a collection of similar natural objects and explains what they are.

4. The student should know that science is part of our everyday life.

   Behavioral Objective: Relates an example of how science helps him have fun.

5. The student should be aware that scientific ideas are the result of many observations and experiments.

   Behavioral Objective: Carries out the same simple experiment several times, using a control and one variable; then compares results.

6. The student should be aware that a scientist is open-minded.

   Behavioral Objective: Appraises reasonable new ideas as they are presented.

7. Does not apply.

Program Goals -- Intermediate Level: (4 - 5 - 6)

1. The student should be aware that science is everywhere.

   Behavioral Objective: Relates an object from his environment to science.

2. The student should be aware that scientists help us understand our world.

   Behavioral Objective: Relates an object to a scientific accomplishment.

3. The student should appreciate the fact that science is both a process and a way of explaining our world.

   Behavioral Objective: Explains how objects of a collection are related to each other.

4. The student should know that science is part of our lives.

   Behavioral Objective: Relates examples of how science helps him to enjoy leisure time.

5. The student should be aware that scientific ideas are the result of many observations and experiments.

   Behavioral Objective: Carries out the same experiment several times, using a control and one variable; then compares results.

6. The student should be aware that the major characteristic of science is open-mindedness.

   Behavioral Objective: Relates a current theory which has not gained universal acceptance.

7. The student should be aware that scientists do research.

   Behavioral Objective: Undertakes a project or investigation.

8. The student should be aware of scientific research methods.

   Behavioral Objective: Given a problem, formulates a hypothesis.

9. The student should be aware of and appreciate the interaction of science and everyday life.

   Behavioral Objective: Given a scientific discovery, provides general examples of its application.

10. The student should be aware of the differences between science and superstition.

    Behavioral Objective: Differentiates between science and a superstition and provides the reason why.

11. The student should be aware of current phenomena.

    Behavioral Objective: Demonstrates interest in current scientific endeavors by bringing in clippings, articles, etc., to class.

Program Goals -- Junior High School Level

1. The student should be aware that there are many disciplines of science.

   Behavioral Objective: Lists five disciplines.

2. The student should be aware of and appreciate the fact that science is generated by people with a compelling desire to understand the natural world.

   Behavioral Objective: Given a biography, formulates his opinions regarding scientific pursuits of that scientist.

3. The student should appreciate the fact that science is both a process and a way of explaining phenomena.

   Behavioral Objective: Given an example of a natural phenomenon, tells how it relates to science.

4. The student should appreciate the fact that science is an integral part of the modern world.

   Behavioral Objective: Relates a scientific development to a vocation.

5. The student should be aware of the fact that science is weighing evidence in the pursuit of knowledge.

   Behavioral Objective: Given a controversial issue, examines a variety of viewpoints.

6. The student should be aware that the major characteristic of science is open-mindedness.

   Behavioral Objective: After having responded to a problem situation and then being given additional information, reconsiders and reformulates his desires.

7. The student should be aware of science as an intellectual activity in itself.

   Behavioral Objective: Undertakes a research project.

8. The student should appreciate the methods of science in research.

   Behavioral Objective: Given a problem, formulates a hypothesis and attempts to verify it with experimental evidence.

9. The student should be aware of and appreciate the interaction of science and technology.

   Behavioral Objective: Given an example of a natural phenomenon such as St. Elmo's Fire, cites instances in which the scientific theories are not in precise conformity.

10. The student should be aware of the differences between science and superstition.

    Behavioral Objective: Differentiates between science and a superstition and provides the reason why.

11. The student should be aware of current phenomena.

    Behavioral Objective: Given a listing of scientific events, identifies current ones.

12. The student should be aware that the processes of science lead to a further quest of knowledge.

    Behavioral Objective: Given the results of a study, states additional possibilities to investigate.

13. The student should be aware that the achievements of science and technology properly used are basic to the advancement of human welfare.

    Behavioral Objective: Draws up a rationale for tax support for community solution of pollution problems.

Program Goals -- Senior High School Level

1. The student should be aware of the disciplines of science.

    Behavioral Objective: Given a limited set of data, limits his conclusion(s) to the data present. Describes a scientific discipline.

2. The student should be aware of and appreciate the fact that science is generated by people with a compelling desire to understand the natural world.

    Behavioral Objective: Formulates a defense of such issues as conservation of natural resources, control of pollution, etc.

3. The student should appreciate the fact that science is both a process and a way of explaining phenomena.

   Behavioral Objective: Given a natural phenomenon, offers a hypothesis to explain it.

4. The student should appreciate the fact that science is an integral part of the modern world.

   Behavioral Objective: Given a list of scientific breakthroughs, identifies those which have changed world events.

5. The student should be aware of the fact that science is weighing evidence in the pursuit of knowledge.

   Behavioral Objective: Given a situation involving several variables, formulates a response which is factually correct and based on experimental evidence.

6. The student should be aware that the major characteristic of science is open-mindedness.

   Behavioral Objective: After having responded to a problem situation and then being given additional information, reconsiders and reformulates his desires.

7. The student should be aware of science as an intellectual activity in itself.

   Behavioral Objective: Uses a variety of resources for a research project.

8. The student should appreciate the methods of science in research.

   Behavioral Objective: Given a problem, formulates a hypothesis and attempts to verify it with experimental evidence.

9. The student should be aware of and appreciate the interaction of science and technology.

   Behavioral Objective: Given an issue such as nuclear weapons, explains the reasons underlying the diverse positions of scientists.

10. The student should be aware of the differences between science and superstition.

    Behavioral Objective: Differentiates between science and a superstition, and provides the reason why.

11. The student should be aware of current phenomena.

    Behavioral Objective: Given a listing of scientific events, identifies current ones.

12. The student should be aware that the processes of science lead to a further quest of knowledge.

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